

PATENT ABSTRACTS OF JAPAN

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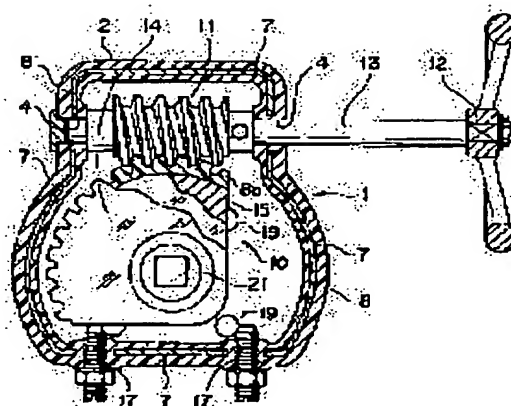
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(54) GEAR DRIVING DEVICE FOR VALVE

(57)Abstract:

PURPOSE: To prevent the dew condensation on a casing even if the heat insulation covering is not applied, when a valve equipped with a driving device is installed in a pipe in which the low temperature fluid flows, by making the whole of the casing and a gear mechanism or a part of the gear mechanism out of the synthetic resin having the low thermal conductivity.

CONSTITUTION: When a gear driving device is installed at the installation flange part of a valve installed in a pipe in which the low temperature fluid flows, the generation of the low temperature due to the fact that the heat is absorbed by the valve side through the installation face is prevented, since a casing 1 having a gear mechanism 10 is made of the synthetic resin 8 having the low thermal conductivity, and the condensation of the moisture in the air on the inside and outside surfaces of the casing 1 is prevented. Further, when also the worm wheel 14 used for the gear mechanism 10 is made of the synthetic resin 8a having the low thermal conductivity, the generation of low temperature due to the fact that the heat of the worm wheel 14 is absorbed by the valve side through a stem 21 is prevented, and the dew condensation and freezing on the surface of the worm wheel 14 can be prevented.



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CLAIMS

[Claim(s)]

[Claim 1] The gear driving gear for bulbs characterized by forming all of the above-mentioned casing and gear devices, or a part of gear device with the synthetic resin of low-feeve conductivity in the gear driving gear for bulbs which the gear device for carrying out drive actuation of the stem for bulbs combining various kinds of gear is contained [driving gear] to casing, and makes this casing carry in the shafting section of a bulb.

[Claim 2] The gear driving gear for bulbs according to claim 1 which laid rodding under the synthetic-resin material in which the above-mentioned casing and a gear device were formed.

[Claim 3] The gear driving gear for bulbs according to claim 1 or 2 the area of the contact surface of the above-mentioned casing and the above-mentioned loading side of the shafting section of a bulb was made to serve as min.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the gear driving gear for bulbs.

[0002]

[Description of the Prior Art] The gear device which consists of a worm and a worm gear in order to open and close a bulb conventionally is constituted, and what formed the gear driving gear which dedicated this gear device to casing in the mounting flange formed in the shafting section upper part of a bulb is known. Casing of this gear driving gear is divided into the case section and the covering section. Generally, these case section and the covering section are formed with the casting of thermally conductive high cast iron or aluminum.

[0003]

[Problem(s) to be Solved by the Invention] However, since casing of the above-mentioned gear driving gear is usually metal, the heat conductivity is very high, when it is used as a driving gear of the bulb which equipped with this gear driving gear piping which pours cryogenic fluid, heat may be taken through a clamp face or a stem at a bulb side, this gear driving gear may become low temperature, the moisture in atmospheric air may dew in respect of the inside and outside of casing, and it may produce waterdrop. For this reason, rusted casing, the work environment of perimeters, such as a floor line, was soiled with the dropped water, or heat insulation covering of a bulb or piping was wet, and there was a problem on which that effectiveness is reduced.

[0004] In order to prevent these problems, a gear driving gear needs to give heat insulation covering with piping and a valve

body. However, since the configuration of a gear driving gear was a little complicated, its construction was troublesome, and in order for it to become impossible to remove the covering section of casing for maintenance check of a gear driving gear and to remove the covering section after construction, it broke heat insulation covering, and it had the problem to which dew condensation prevention becomes inadequate. The place which this invention is developed in view of the above-mentioned technical problem, and is made into the purpose is to offer the gear driving gear which does not cause dew condensation to casing even if it does not give heat insulation covering to a gear driving gear, when piping for which cryogenic fluid flows is equipped with the bulb which has a gear driving gear.

[0005]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention contained the gear device for carrying out drive actuation of the stem for bulbs combining various kinds of gear to casing, and considered it as the configuration characterized by forming all of the above-mentioned casing and gear devices, or a part of gear device with the synthetic resin of low-thermal conductivity in the gear driving gear for bulbs which makes this casing carry in the shafting section of a bulb. In this case, it is desirable to constitute the area of the contact surface of the casing and the loading side of the shafting section of a bulb which laid underground and described rodding above for the synthetic-resin material in which the above-mentioned casing and a gear device were formed so that it may become min.

[0006]

[Function] When it is used as a driving gear of the bulb which equipped with the gear driving gear of this invention piping which pours cryogenic fluid, since casing of this gear driving gear is formed with the synthetic resin of low-thermal conductivity, heat is taken through a clamp face at a bulb side, it does not become low temperature, and the moisture in air does not dew in respect of the inside and outside of casing. In this

case, if the protruding line section is formed in the clamp face at the base of casing, since a touch area with the mounting flange sections, such as a driving gear formed in the bulb, can be made into min, transfer of the heat from casing to a bulb side can be suppressed further. In this invention, since rodding is laid underground in case casing is formed, though it is lightweight, high reinforcement is obtained.

[0007] If all or a part of gear used for the gear device of a gear driving gear are formed with synthetic resin, since heat will be taken from gear through a stem at a bulb side and these gear will not become low temperature, the front face of these gear is not dewed within a gear driving gear. Moreover, if rodding is prepared in these gear, the dependability of a gear driving gear can be raised. And since lubrication is also unnecessary, a bulb can be opened [gear / the gear made of synthetic resin do not rust, and] and closed lightly.

[0008]

[Example] One example of the gear driving gear for bulbs of this invention is explained in full detail from this. The gear driving gear of this example is shown in drawing 1. The gear driving gear shown in this example is the device in which slow down rotation of a handle 12 and an output is increased, is equipment which rotates the stem 21 of a bulb 20 with this output, and performs closing motion of a valve element (not shown) etc., and is formed in the mounting flange 22 formed in the shafting section upper part of a bulb 20 with the bolt 19. At this example, closing motion of the valve element of a bulb 20 etc. is performed by the gear device 10 which consists of the worm 11 and worm gear 14 which were dedicated to casing 1, or a combination configuration of a main wheel and a pinion which is not illustrated.

[0009] A worm gear 14 fixes near the upper limit section of the stem 21 of a bulb 20, intersecting perpendicularly with the axis of a stem 21, a worm 11 is specifically formed so that it may gear to this worm gear 14, and the handle 12 is formed in the point of the shaft 13 which extended from this worm 11. The

bearing holes 4 and 4 which insert in a shaft 13 are formed in case section 2 side face of casing 1, and as shown in drawing 3, the insertion hole 16 which inserts in the stem 21 of a bulb 20 is formed in the loading side 3 of the case section 2.

[0010] Moreover, in order to consider the stem 21 rotation include angle from the close by-pass bulb completely of a bulb 20 to full open as 90 degrees of abbreviation, the worm gear 14 used the sector thing, and since the gear driving gear of this example uses for a bulb 20 like a butterfly valve or a ball valve, it provides stoppers 17 and 17 so that rotation can be stopped by full open and the closed position. On the other hand, the opening directions section 18 interlocked with a stem 21 as shown in drawing 2 is formed in the top face of the covering section 6 which carries out the tegmentum of the case section 2. In addition, the above-mentioned gear device 10 is an example, and it is not necessary to say that it can carry out in the form of others.

[0011] As described above, casing 1 has the composition that the covering section 6 is formed in the case section 2, and these are formed with the synthetic resin 8 of low-feeve conductivity. The so-called engineer plastics which is excellent in workability, such as rigid polyvinyl chloride, epoxy, and FRP, for example, and has high reinforcement as synthetic resin 8 is used suitably. Moreover, formation of the casing 1 of the case section 2 by synthetic resin 8 or covering section 6 grade is performed [synthetic resin / 8] by proper metal mold (not shown) by carrying out insert molding in the rodding 7 formed in *****.

[0012] Rodding 7 can form a metal plate easily by folding or carrying out press working of sheet metal. In this case, although the metal plate used for rodding 7 is not illustrated, a punching metal and the thing which punched many holes of a configuration suitably are used for it. It is desirable to use the stainless plate which is an ingredient with comparatively low thermal conductivity also in a metallic material as the quality of the material of rodding 7. Moreover, when preparing

shaft bearing, after fixing shaft bearing to rodding 7, covering formation of the synthetic resin 8 can be carried out, and the casing 1 of the case section 2 or covering section 6 grade can also be formed.

[0013] The casing 1 which has the gear device 10 fixes with a bolt 19 to the mounting flange section 22 of a bulb 20, as shown in drawing 3 or drawing 4. The proper protruding line section 5 is formed in the clamp face 3 of case section 2 base which is casing 1, and it consists of this examples so that a touch area with the loading side of the mounting flange section 22 of a bulb 20 may serve as min. The protruding line section 5 is formed in the annular form which goes the clamp face 3 of case section 2 base around in drawing 3, and the protruding line section 5 is formed by forming the circular sulcus of two articles at drawing 4. However, it is not limited to the means of drawing 3 or drawing 4 by lessening the touch area of the loading side of the mounting flange section 22, and the clamp face 3 of the case section 2. Moreover, the above-mentioned protruding line section 5 may not consider as a perfect annular form, but may be made into an intermittent annular form.

[0014] By the way, with the gear driving gear for bulbs of this example, the worm gear 14 used for the gear device 10 is also formed by synthetic-resin 8a of low-fever conductivity which formed rodding 15. The same thing as the thing in which casing 1 was formed is used for the quality of the material of synthetic-resin 8a used here or rodding 15. In drawing 1, although the rodding 15 of a worm gear 14 has a simple sector, rodding 15 may be put in to the gear tooth of gear if needed. Moreover, although illustration has not been carried out, the base of a worm gear 14 is formed by synthetic-resin 8a, and only a dental part is good also as a metal. If still more nearly required, a worm 11 and a shaft 13 can also be formed with the synthetic resin of low-fever conductivity, and rodding can be prepared in these if needed.

[0015] Next, an operation of this example is explained. When it prepares in the mounting flange section 22 of a bulb 20 which

equipped with the gear driving gear of this example piping (not shown) for which cryogenic fluid flows, since the casing 1 which has the gear device 10 is formed with the synthetic resin 8 of low-thermal conductivity, heat is taken through a clamp face 3 at a bulb 20 side, it does not become low temperature, and the moisture in air does not dew in respect of the inside and outside of casing 1. In this case, since the protruding line section 5 is formed in the clamp face 3 of case section 2 base of casing 1 and a touch area with the loading side of the mounting flange section 22 of a bulb 20 can be made into min, transfer of the heat from casing 1 to a bulb 20 side can be suppressed further, and dew condensation prevention can be made into a more positive thing.

[0016] Since rodding 7 is formed in case casing 1 is formed in this example, high reinforcement has been obtained though it is lightweight. Therefore, even if a high load is applied to the gear device 10 with closing motion of a bulb 20, casing 1 does not deform or breakage of a crack etc. is not caused. Moreover, since rodding 7 uses what punched many holes like a punching metal, in case insert molding of the synthetic resin 8 is carried out with formation metal mold (not shown) and casing 1 is formed, the synthetic resin 8 in the front face and rear face of rodding 7 can combine a front flesh side in one through many holes.

[0017] If the worm gear 14 used for the gear device 10 is also formed by synthetic-resin 8a of low-thermal conductivity, since heat will be taken through a stem 21 at a bulb 20 side and this worm gear 14 will not become low temperature on the other hand, dew condensation is not caused on the front face of a worm gear 14, or it does not freeze over. In this example, since rodding 15 is formed in the worm gear 14, reinforcement equivalent to the conventional metal gear can be obtained, and the dependability of a gear driving gear can be raised. Formation of a worm gear 14 is performed like the above-mentioned casing 1. In this case, if many holes are punched also at the rodding 15 of a worm gear 14, high reinforcement can be obtained

according to the same operation as ****. Thus, since lubrication is also unnecessary, a bulb 20 can be opened [worm gear / the worm gear 14 which carried out heat insulation covering by synthetic-resin 8a does not rust, and] and closed lightly. [0018]

[Effect of the Invention] According to the gear driving gear for bulbs of this invention, it has the effectiveness which was excellent in following many a clear passage by the above explanation. That is, since casing which contains the gear device which constitutes a gear driving gear, and this gear device was formed with the synthetic resin of low-feeveer conductivity, when using these for the piping way where cryogenic fluid flows, dew condensation is caused in the inside-and-outside side of casing, or the gear device inside casing, and they are not made to produce waterdrop. While heat insulation covering of the gear driving gear which time and effort applied very much conventionally becomes unnecessary by this and the workability of the bulb to a cryogenic piping way improves, maintenance check of the gear driving gear after construction can also be performed easily. Moreover, since neither casing nor a gear device dews, waterdrop trickles, a floor line is soiled, or heat insulation covering given to a bulb and piping is wet, and the adiabatic efficiency is not reduced. And since a gear driving gear does not dew, there is no rusting these and causing trouble to the actuation, and it has the effectiveness of being able to obtain the very reliable gear driving gear for bulbs.

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